

SURGICAL TECHNIQUES

A technique for the reconstruction of lower eyelid marginal defects

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Objectives: To report on a new one-step technique for the reconstruction of lower eyelid marginal defects.
Method: Retrospective case series of 5 patients with lower eyelid basal cell carcinomas abutting the eyelid margin. In all patients, the tumour was radically excised with a 3-mm clear cutaneous margin and a 2-mm tarsoconjunctival margin under frozen section control. Defect size ranged from 12 to 22 mm horizontally and from 8 to 9 mm vertically. For eyelid reconstruction, the 2-mm residual lower lid tarsus was advanced superiorly on a conjunctival pedicle and sutured into the posterior lamella defect. The anterior lamella was reconstructed with orbicularis muscle advancement and a free skin graft from the ipsilateral upper eyelid. The outcome following surgery was assessed using a subjective scoring system with 4 subsequent grades (poor, adequate, good, excellent).

Results: At 1 week postoperatively, adequate viability of the grafts was noted in all patients. One patient developed transient punctate epithelial keratopathy. After a mean follow-up of 10 months (range 1 to 21 months) the outcome was "poor" in 0 patients, "adequate" in 0 cases, "good" in 1 case and "excellent" in 4 cases.

Conclusion: Reconstruction of small to large lower lid marginal defects with local tarsoconjunctival flap advancement combined with orbicularis muscle advancement and free skin graft is associated with a good functional and cosmetic outcome and limited donor-site morbidity.

Basal cell carcinomas account for approximately 90% of eyelid tumours and most frequently involve the lower eyelid.¹ Several techniques can be used to reconstruct lower lid marginal defects (table 1). We present a one-step technique to repair lower lid marginal defects in patients with cutaneous tumours abutting the lower lid margin. In this technique, the posterior lamella is reconstructed by advancing the residual lower lid tarsus on a conjunctival pedicle, as described by Irvine and McNab for the upper eyelid.⁷ The anterior lamella is reconstructed by orbicularis muscle advancement and a free skin graft, as recently reported by our group.⁵

PATIENTS AND METHODS

We included five patients with lower eyelid marginal defects ranging from 8 to 9 mm in height and 12 to 22 mm in length after tumour excision. Patients underwent uncomplicated surgical reconstruction performed by one surgeon (D P) from December 2003 to January 2007. All tumours were excised with 2-mm tarsal margins to allow a residual vertical tarsus of 2 mm, which is required for the reconstruction technique. All tumours were diagnosed as basal cell carcinomas with clear margins under frozen section control. Postoperatively, we scored the result as follows:

- Poor: more than 2 mm retraction and/or severe ectropion; and/or severe cosmetic disfigurement
- Adequate: 1 to 2 mm retraction and/or mild ectropion; and/or mild cosmetic disfigurement
- Good: up to 1 mm retraction, no ectropion, no to very mild cosmetic disfigurement
- Excellent: no retraction, no ectropion, very little or no cosmetic disfigurement

Surgical technique

The reconstruction technique described below requires a minimum of 2 mm height of residual lower lid tarsus after tumour excision (fig 1). With straight Stevens scissors, two vertical cuts are made in the residual tarsal plate and conjunctiva on each side of the lower lid defect. After releasing the lower eyelid retractors from the conjunctiva, the tarsoconjunctival pedicle is advanced superiorly and sutured inline into the posterior lamellar defect with 6-0 vicryl. Next, the orbicularis muscle is undermined, mobilised and sutured on the advanced tarsus. A free skin graft is harvested from the ipsilateral (or contralateral) upper eyelid to reconstruct the anterior lamella. The skin graft is sutured to the tarsus along the reconstructed lid margin with fast-absorbing 7-0 vicryl and into the anterior lamella defect with fast-absorbing 6-0 vicryl.

Table 1 Alternative surgical techniques for the repair of lower eyelid marginal defects

Modified Hughes flap (+free skin graft) (two-step technique) ²
Tarsomarginal graft (= composite graft)+skin flap (one-step technique) ³
Free tarsoconjunctival graft (from upper lid)+skin-orbicularis muscle flap (one-step technique) ⁴
Sandwich technique (= free tarsoconjunctival graft+orbicularis muscle flap+skin graft) (one-step technique) ⁵
Tenzel semicircular flap one-step (one-step technique) ⁶

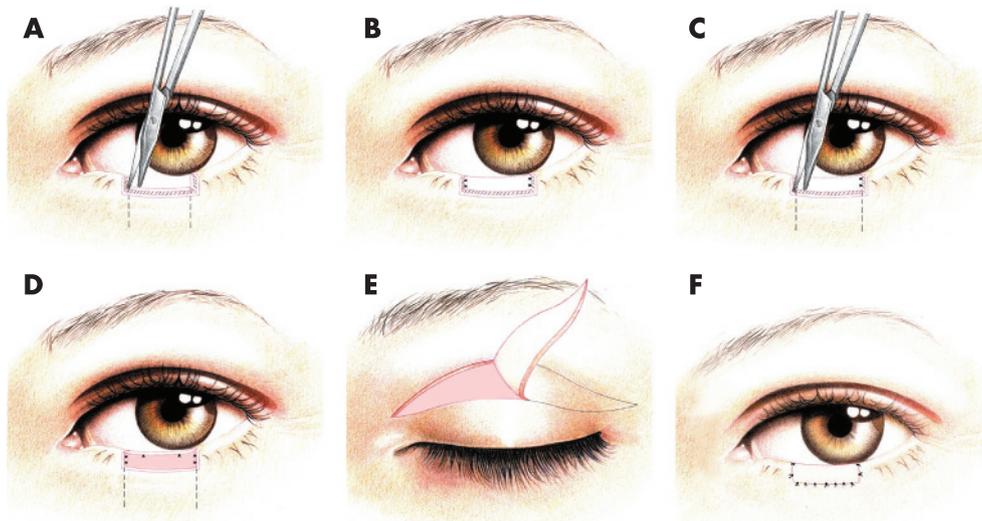


Figure 1 Schematic drawing: (A) A tarsoconjunctival pedicle is created by two vertical cuts in the residual 2 mm tarsal plate and conjunctiva. The lower eyelid retractors are released from the conjunctival pedicle. (B) This flap is advanced superiorly and sutured into the posterior lamellar defect. (C) The orbicularis muscle is undermined and mobilised. (D) The orbicularis muscle is sutured on the tarsoconjunctival flap. (E) A free skin graft is harvested from the ipsilateral upper eyelid and sutured into the anterior lamellar defect (F).

RESULTS

Details on sex and age of the patients, size of the eyelid defect, complications and length of follow-up are listed in table 2.

One patient was found to have punctate keratitis at 1 week after surgery, which was successfully treated with topical lubricants. In one patient, a few lanugo hairs were noted in the anterior lamella without causing corneal irritation or punctate epithelial keratopathy.

After a mean follow-up of 10 months (range 1 to 21 months), the outcome was good in 1 case and excellent in 4 cases (fig 2).

DISCUSSION

As shown in table 1, several surgical techniques have been used for the reconstruction of marginal lower eyelid defects. To our knowledge, the use of lower lid tarsal advancement combined with orbicularis muscle mobilisation and a free skin graft in lower lid reconstruction has not been reported. Kuckelkorn *et al* describe eight patients with cicatricial lower lid entropion, in which they excised the scarred tarsal margin and reconstructed the lower lid margin by lower lid tarsoconjunctival advancement.⁸

Irvine and McNab reported a one-step technique for upper eyelid marginal defect repair utilising local posterior and anterior lamella advancement.⁷ The vertical height of the lower lid tarsus is about 4 mm, vs 10 mm in the upper lid. The use of our technique is limited to cases in which a minimum of 2 mm tarsus remains. A smaller amount of tarsus would result in an unstable eyelid. To avoid retraction of the reconstructed lower eyelid, the lower eyelid retractors are released from the conjunctival pedicle prior to advancement of the tarsoconjunctival flap. This compares with the technique described by Irvine and McNab for the upper eyelid, in which the levator and Muller's muscle are released from the conjunctival pedicle.⁷ The presence of lanugo hairs occurred in one case (case 3, table 2).

Although corneal touch by lanugo hairs may be reduced by suturing the skin graft in a slightly recessed position, we feel this might induce a cosmetically disturbing hyperaemia of the lid margin. Therefore, we chose to suture the skin graft in line with the lid margin.

Compared with the modified Hughes flap, the advantage of our technique is that it is performed as a one-step procedure. Furthermore, it is associated with less donor-site morbidity compared with another one-step technique, which involves the use of a free tarsoconjunctival graft (table 1). Compared with the use of composite grafts or the Tenzel flap, our technique can be used for defects of greater horizontal length, as demonstrated in case 3 (table 2). Compared with the Tenzel flap, our technique does not involve a cutaneous incision which crosses relaxed skin tension lines, nor does it disrupt the lateral canthus. As in the use of Tenzel flaps, the focal absence of original eyelid margin including glands, and the presence of lanugo hairs, may lead to ocular irritation. However, ocular irritation may result from any other reconstruction technique, especially when the procedure is complicated by notching.

A potential disadvantage of this technique is the small excision margin at the tarsal side of the basal cell carcinomas. However, Hsuan *et al* show in their 5-year result study that a 2-mm margin excision for adnexal nodular basal cell carcinomas is safe and efficient.⁹ Furthermore, in this report, frozen section control showed clear margins in all lesions, later confirmed by routine histology.

A drawback of this study is the limited number of treated cases. More patients need to be studied to evaluate the efficacy of our technique compared with existing methods to reconstruct marginal lower eyelid defects.

In conclusion, the technique described offers an elegant one-step procedure which may provide a good cosmetic and functional result.

Table 2 Patients' characteristics, complications and length of follow-up

Patient no.	Age/sex	Horizontal defect size (mm)	Vertical defect size (mm)	Early complication	Late complication	Length of follow-up (months)
1	50/F	12	9	Punctate keratitis	None	21
2	62/M	13	8	None	None	6
3	65/F	22	8	None	Lanugo hairs	21
4	68/F	16	8	None	None	3
5	85/M	13	8	None	?	1

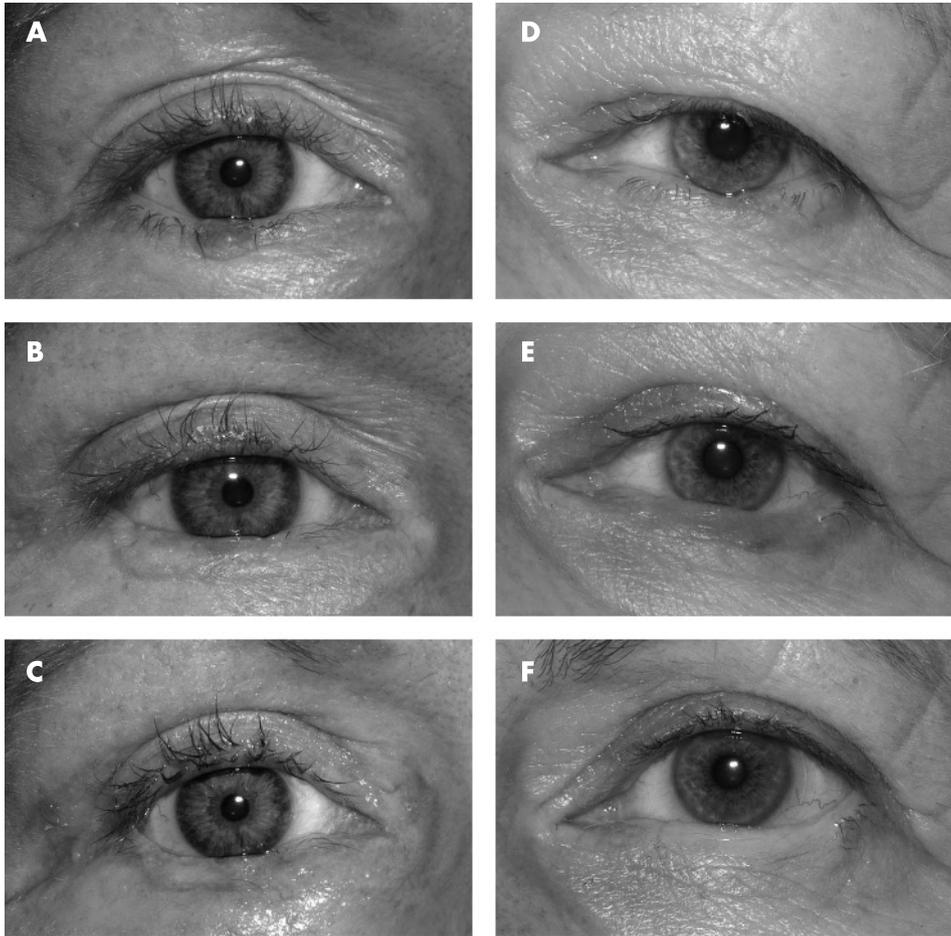


Figure 2 Case 1 (A) Nodular basal cell carcinoma abutting the right lower eyelid margin. (B) Postoperative result at 6 weeks. (C) Result after 12 months. Case 3 (D) Nodular basal cell carcinoma abutting the left lower eyelid margin. (E) Postoperative result at 6 weeks. (F) Result after 21 months.

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